


**Research Article**


# Advantages and Disadvantages of Using Inorganic Fertilizers for Agriculture

**Danlie Dox E. Finez and Jasper E. Talimbay**

Senior High School, High School Department, Espiritu Santo Parochial School of Manila, Inc., Manila, Philippines

**Article Information**

**Article ID Number**

202303001

**Article History**

Received	04	Mar	2023
Reviewed	05	Mar	2023
Revised	07	Mar	2023
Accepted	31	May	2023
Published	30	Jun	2023

**Gunning Fog Index:** 13.17

**Similarity Index:** < 20%

**Corresponding Author/s**

Danlie Dox E. Finez

[danliedoxf@gmail.com](mailto:danliedoxf@gmail.com)

Jasper E. Talimbay

[talimbayjasper27@gmail.com](mailto:talimbayjasper27@gmail.com)

**Quick Response Code**



Copyright © 2023 by the Author/s

**Abstract**

The main objective of this research is to examine how effective inorganic fertilizers are for agriculture and other crops, especially rice. Interviews and questionnaires are the instruments used to collect the data. Fifty farmers were asked about their crop fertilization practices using inorganic fertilizers. Because most farmers are elderly and uneducated in technology, these tools were used. After conducting a thorough data gathering, the results showed that the farmers strongly agreed on the effectiveness of using inorganic fertilizers in their rice fields in terms of the growth, quality, and productivity of the rice. The results also showed that there is a significant difference between inorganic fertilizer and organic fertilizer in the rice field. However, as stated in the results, 35 out of the 50 respondents, which are the farmers, are more in favor of using Inorganic fertilizers such as urea, triple 14, 1620 fertilizers, and 21-00 fertilizer, as it makes their rice more plentiful on harvesting day. Even though organic fertilizers are considerably safer and more natural to use, most farmers have been using inorganic fertilizers because they provide nutrients more efficiently than traditional fertilizers.

**Keywords**

advantages, agriculture, disadvantages, effectiveness, inorganic fertilizers

DOI 10.5281/zenodo.8137249

URL: <https://actonlineedu.org/ijtr-v1i1-202303001>

This is an open access article under the CC BY-NC-ND license.



Published by

**Academic Course Tutorial Online Education Inc., Philippines**

Philippine SEC Registration No. 2022090068590-16 Website: <https://actonlineedu.org/>



## INTRODUCTION

### Background of the Study

Farms grow crops, breed cattle, and generate wool, among other things, because of agriculture. Agriculture plays a significant role in producing food, clothing, and other goods. Yet agricultural cultivation is the main emphasis of this study. Inorganic synthetic fertilization, or fertilization in general, is made up of chemicals and minerals that have a place on the periodic table. These fertilizers are entirely artificial and undergo a production process. Two German chemists, Carl Bosch and Fritz Haber, first developed fertilizer in 1903. It quickens the pace at which plants receive nutrients; some contain  $(\text{NH}_4)_2\text{SO}_4$ , ammonium, or both. Sulfate, Ammonium Nitrate, Ammonium Phosphate,  $\text{K}_2\text{SO}_4$ , Ammonium Nitrate,  $(\text{NH}_4)_3\text{PO}_4$ , and Potassium Superphosphate,  $\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot 2\text{H}_2\text{O}$ , Triple Superphosphate, Sulfate,  $\text{CaH}_6\text{O}_8\text{P}_2$  +2. Because organic fertilizers feed the soil, they differ from inorganic fertilizers that directly provide nutrients to the plant. Mowbot, T. (2018) claims that overuse of Synthetic fertilizers can result in horrible soil, and they can also, over time, leave the soil with some difficulties, alter soil pH, multiply pest issues, and release greenhouse gases. Farmers who use synthetic fertilizers are designed to absorb nutrients more quickly than organic ones, making their task a little bit easier because they are well-versed in manual labor.

But Kakar, K. *et al.* (2020) found that the outcome decreased the nutritional and grain quality of the crop as well as excessive inorganic fertilizer use, affecting its biodiversity. Syngenta, G. (n.d.) Current challenges for agriculture include: To meet the increased demand for more food and higher quality, which can be problematic in modern times due to climate change that affects farmers and their products, it is also necessary to embrace and learn new technology, and inorganic fertilizer is examined. Due to the poor sales and difficulties in trading, both the modern farming method and some farmers in rural cities or places who are ignorant of technology and still practice the ancient methods of farming are impacted. The study's hopeful goal is to help a group of farmers who do not have access to employ contemporary fertilizers and educate themselves on the potential pitfalls of the product results, addressing specific questions like Is the texture of the outcome equivalent to the use of organic fertilizers? Will research on particular types of crops, such as wheat and more, be conducted to demonstrate the benefits and drawbacks of inorganic fertilizers? Can you describe the flavor? After harvesting, can the soil still be used? Planning and working with climate change can help alleviate the Philippines' ongoing food crisis.

### Theoretical and Conceptual Framework

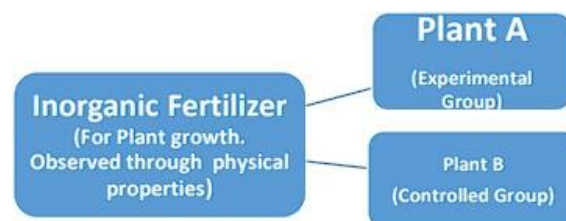
According to Moriconi and Santa-Maria (2013), using several indicators at once may aid in improving plant breeding for high NUE. The information also suggests that the dynamics of plant systems include a trade-off between plant productivity and the amount of time required to cut the concentration of  $\text{K}^+$  in half. The idea is that for some plant species, selection for high NUEa would not always be in opposition to selection for better relative plant performance in low  $\text{K}^+$  conditions.

Plants A and B will be given inorganic fertilizer as the experimental and control groups in the study, respectively. Once plants acquire nutrients from fertilizer, it will improve their efficiency in using nutrients, particularly nitrogen, phosphorus, and potassium.

This research is related to the notion of "Potassium Utilization Efficiency in Response to Withdrawal of Potassium." Yet if one of the fertilizer's ingredients, like nitrogen, is missing, The plants won't continue to get better.

The hypothesis establishes the value of further research into synthetic fertilizers to increase the efficacy of nutrients delivered directly to crop fields.

**Figure 1**  
Conceptual Framework of the Study



The independent variable-dependent variable model, often known as the IV-DV Model, is used in the study "Advantages and Disadvantages of Utilizing Inorganic Fertilizer for Agriculture." The framework consists of two sets of independent variables, one of which is inorganic fertilizer. The depiction of arrowheads pointing to the right serves as a link between the ideas or thoughts. Yet organic fertilizers have an impact on the physical characteristics of plants.

Considering the experimental style of research, the independent variable is composed of two sets: the experimental group as plant a and the controlled group as plant b. The researcher will divide the pre-grown plants into two groups. Every two weeks, inorganic fertilizer will be applied to the plant. Plant B will receive the standard care that inorganic fertilizer brings, while the former will not (two times a month).

### Statement of the Problem

This study attempts to assess the benefits and drawbacks of fertilizer use in agriculture to assist farmers in deciding whether to use inorganic or organic fertilizer. The investigation must ascertain the following to accomplish this goal:

1. How can Inorganic fertilizers be beneficial in terms of the growth of plants?
2. What are the harmful effects of excessive and uncontrolled use of inorganic fertilizers?
3. Based on the results of the study, will the use of inorganic fertilizers continue?

## METHODS

### Research Design

The study is quantitative and falls under true experimental research; the design is suitable. The title requires assignments, statistics, and scientific methods. Identifying whether inorganic fertilizers are good or bad needs time and monitoring now and then, whereas the study is under the category of true experimental research; for example, putting ladies' fingers (okra) in the experimental group receiving inorganic fertilizers, and eggplant will be put on a controlled diet and will obtain organic fertilizers such as manure, seaweed, worms, castings, and others. By observing these plants, researchers should pick up information on any differences as the crop grows.

### Sample and Sampling Technique

Having two groups and treating them differently according to the attributes of the research design and assigning a stratified sampling technique met the satisfactory and most appropriate criteria. This allows farmers who use inorganic fertilizers to be the respondents.

### Research Instrument

The study uses two instruments to gather data: an observation guide and a questionnaire or survey. The researchers will conduct the observations to record the daily changes or improvements of plants in terms of their number of leaves, height, stem, and color. The researchers will use a pen and paper to take notes on this instrument. The researchers will also use a ruler to give accurate measurements. The researcher had no idea what would happen in the study. However, plant growth will be closely monitored.

The activity that should be done every day is associated with daily watering of plants, proper exposure to sunlight, adequate soil, and the unidirectional application of inorganic fertilizers to an experimental group of plants, which should be treated first in two weeks, and to the control group, which should be treated twice a month.

### Data Gathering Procedure

Researchers will go around farms and search for specific crops; farms that use inorganic fertilizer companies and their farmers will be interviewed. The researchers will ask farmers to guide and elaborate on how crops grow, progress, and the outcome of the crop.

By monitoring the crops, researchers can gather data by documenting the crop while still conducting interviews and questionnaires in the area. Preparing an extra-confined space of soil for the plant or a pot full of quality soil for the experimental group and planting the okra seeds in it by sowing 1/2 to 1 inch deep in the soil, keeping it in a sunny place, and watering it every so often, basically giving it its basic needs, keeps the plant alive in its early stages. Inorganic fertilizer utilization comes into play when the plants are at the climax of the growing cycle. The best season for planting ladies' fingers is in the spring, when the cold days have passed. A controlled group plant is an eggplant; it takes roughly 70–80 days, and sometimes around 100 days. It can be planted indoors or in pots, and its best time for planting is from July to October.

Plant eggplant seeds the same as okra, giving it its needs and applying organic fertilizers when it's at its peak growing cycle.

### Data Analysis

Using descriptive analysis, given that the research design is quantitative, Researchers can estimate how the variables will react; the results of the research study will be thoroughly scanned and clarified by the researchers; and the gathered data from the respondents will answer the questions of the research title because most of the data will come from interviews and questionnaires.

### Ethical Considerations

The researchers' safety and health will be a top priority in this study. If an emergency occurs, the study will stop immediately. Regarding the soil, the researcher will check daily to see if there is any damage or pests that need to be resolved. Plants will be given sufficient sun exposure and watered daily.

The researchers will continue to provide inorganic fertilizers to the test group of the plant, to be managed once every 2 weeks, and the control group, to be managed twice a month, while the study is ongoing.

## RESULTS

### Understanding the Use of Inorganic Fertilizers in Crop and Livestock Production *Effects of Inorganic Fertilizer Application on Plant Productivity*

The collected data includes descriptive analysis, and the data was thoroughly reviewed and analyzed before being included in the paper. The researchers devised seven questionnaires to identify the paper's main issues. Furthermore, the researchers gathered data by walking around the area looking for farmers to fill out survey questionnaires. The information gathered was organized into tables with narrative descriptions.

**Figure 2**

*Response on the Effectiveness of Inorganic Fertilizer for Agriculture from the Farmer's*

Indicators	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
1. Often uses inorganic fertilizers for rice field	41	8	1	0	50
2. Inorganic fertilizers are more effective than organic fertilizers	35	11	4	0	50
3. Inorganic fertilizer improves the growth of plants in terms of number of leaves, color, size and quality of soil	32	16	2	0	50
<b>Total</b>	<b>108</b>	<b>35</b>	<b>7</b>	<b>0</b>	<b>150</b>

**Figure 3**

*Quantity of Inorganic Fertilizers Used by Stakeholders*

Indicators	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
1. Aware of the proper etiquette for the handling of inorganic fertilizers	7	21	22	0	50
2. Spent a maximum of 12,000 per hectare for inorganic fertilizers	9	17	21	3	50
3. Uses triple 14, urea, 1620 fertilizer and 21-00 fertilizer	38	12	0	0	50
4. Plants treated with inorganic fertilizers are more plentiful than those plants which did not have the same treatment	18	25	7	0	50
<b>Total</b>	<b>72</b>	<b>75</b>	<b>50</b>	<b>3</b>	<b>200</b>

Figure 2 demonstrates that, out of 50 respondents, seven are well-known for handling inorganic fertilizers, 21 are unsure but agree, and 22 are undecided about how to handle inorganic fertilizers. Figure 3 presents responses from 50 farmers who spend a maximum of 12,000 PHP per hectare on inorganic fertilizers, including nine who highly agree, 17 who agree, 21 who disagree, and three who strongly disagree. The usage of inorganic fertilizers by farmers, including triple 14 urea, 1620 fertilizer, and 21-00 fertilizer, is shown in the figure. For a total of 50 respondents, 38 farmers said that they use these types of inorganic fertilizers, with 12 using them occasionally.

In Figure 3, respondents are questioned about whether plants that have received inorganic fertilizer treatments are more numerous than plants that have not received the same care. For a total of 50 respondents, 18 strongly agree, 25 agree, and seven disagree. There were 200 replies for all four tables and four indicators, with 72 respondents strongly agreeing, 75 respondents agreeing, 50 respondents disagreeing, and three respondents strongly disagreeing.



## DISCUSSION

This study was conducted to understand the effects of synthetic fertilizers used on crops. Understanding fertilizers involves being aware of their benefits and drawbacks, as well as how they affect crops, soil, and the surrounding plant life. This study was accomplished because agriculture plays a significant role in the economy and way of life. Knowing about plant nutrients has several advantages since farmers can use the appropriate fertilizers to maximize their production. Although there are differences between these fertilizers, it is always up to the farmers to understand the importance of applying them correctly because there are subtle differences in how to do so.

### Fertilizers

Robert E. (2023) defines fertilizers as natural or artificial substances containing chemical elements that promote plant growth and productivity. Soil fertility is the quality of soil that enables it to provide compounds in adequate amounts and in proper balance to promote the cultivation of plants. Fertilizers may be utilized to supply the needed plant nutrients. He also stated that a minimum of 16 different elements are required by plants, with carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, potassium, calcium, and magnesium ranking as the most crucial. Other nutrients are absorbed from the soil, while plants acquire carbon from the environment, hydrogen, and oxygen from water.

Even though plants contain sodium, iodine, and cobalt, these elements are not needed. Aluminum and silicon fall within this category as well. Christopher J., S., et al. (2020) claim that fertilizers are added to crops to produce enough food to feed the human population. Different kinds of fertilizers, whether organic or inorganic, have distinct impacts on different varieties of crops. For instance, compost, animal manure, and coffee grounds are some of the best fertilizers for tomatoes. Most of these fertilizers include essential nutrients such as potassium, phosphorus, and nitrogen. It also depends on how much fertilizer is acclimated to the soil; the more fertilizer applied, the faster it grows.

### Organic Fertilizers

Farmers have utilized organic fertilizers for a long time because of their qualities, including their capacity to improve the soil's physical properties, making it more fertile, which are essential for plant growth as soil serves as the medium through which plants develop, get nutrients, and take up water. If used properly, organic fertilizers can assure your plant's safety with an exceptionally low probability of withering. These nutrients, which originate from organic matter and also include carbohydrates, proteins, lipids, and other compounds, can provide your plant with its basic needs. It can last much longer than chemically produced crops, and it's also environmentally friendly, so pests will likely not show up to ruin your crops.

Organic fertilizers also affect the physical properties of the crop, according to Li, S., Li, J., Zhang, B., et al. (2017). Long-term application of organic fertilizer can improve the quality of vegetables, and organic fertilizers produce significantly longer and wider leaves. They also stated that it affects taste by saying, "The content of TA in the third rotation decreased compared with the first rotation, indicating that organic fertilizer can improve the vegetable taste." Although organic fertilizers are much safer to use, they have some downsides. The drawbacks of organic fertilizers, according to Emerald Lawns (2015), are that NPK directly affects plant growth by feeding the plant, some organics can take longer to green up the lawn, and it frequently takes longer to assist your plants to flourish.

### Inorganic Fertilizers

Nevertheless, given its effectiveness on various livestock and crops, it has a significant impact on agriculture. It preserves the health of the soil for the plants and improves plant quality and growth in terms of leaf number, color, and aeration. Inorganic fertilizers, according to Widyati (2019), are associated with a decrease in some soil properties and crop yields over time. Inorganic fertilizer applications have a positive impact on soil properties and are beneficial to plant growth. Many farmers nowadays benefit from the use of inorganic fertilizer in their production, particularly on harvesting day, when most of their plants treated with inorganic fertilizer were found to be more plentiful than those that did not receive the same treatment. Wu, W., Wu, J., et al. (2017) found that the biomass of maize shoot and root from the treatments with inorganic P fertilizer was 17.8 and 10.0 times higher than the treatments with no changes (CK), respectively. The biomass from the organic fertilizer treatments was only comparable to the CK. Moreover, the concentrations of Cd, Pb, Cu, and Zn in the roots of maize grown in inorganic P fertilizer-amended soil decreased by 85.0%, 74.3%, 66.3%, and 91.9%, respectively. Urease and catalase activities were always 3.3 and 2.0 times higher than CK in the soil with inorganic P fertilizer, but there was no change in the soil with organic fertilizer. As well, numerous studies have shown that organic fertilizer cannot survive without the presence of inorganic fertilizers for plant growth. It is said that combining organic and inorganic fertilizers is very effective. Gosal et al. (2018) stated that the soil was handled with various combinations of inorganic nitrogen (N) and organic sources (sewage sludge and compost). The amount of organic matter (0.36%), available phosphorus (16.50 kg/ha), and available potassium (239.80 kg/ha) in the soil increased by a lot after mineral NPK was added in a mix with 50% N through compost. However, when compared to organic fertilizer, inorganic fertilizer has distinct characteristics. Serri et al. (2021) support the hypothesis that fertilization practices resulted in higher biomass production of root (all treatments) and shoot (all treatments except biphosphate) plants than control plants. When compared to control plants, leaf minerals such as N and K (in vermicompost, NPK, and glycine treatments), leaf P and Fe (in vermicompost and glycine treatments), and leaf Zn (in vermicompost treatment) were significantly increased. Compared to control plants, when inorganic fertilizers, especially NPK fertilizer, were used, coriander grew, produced more, and had better biochemical quality in many ways. This was true for root and shoot biomass, leaf SPAD value, ascorbic acid, mineral nutrients, flavonoids, and antioxidant activity.

In contrast, when used excessively, inorganic fertilizer has negative effects on agriculture. As a result, farmers must be well-versed in the proper application and etiquette of inorganic fertilizers on various crops and livestock. Roba claims that T.B. (2018) inorganic fertilizer is typically instantly available and contains all necessary nutrients that are directly accessible to plants. However, continued use of inorganic fertilizers causes soil organic matter degradation, acidification, and pollution of the environment. However, the continued use of inorganic fertilizers causes soil organic matter degradation, soil acidification, and environmental pollution. Furthermore, inorganic fertilizers can contaminate or pollute water, potentially harming human health. According to Sharma et al. (2017), inorganic fertilizers accumulate salt, which requires more energy to draw water from the soil and causes them to appear wilted or dried out. If there is rainfall shortly after they are applied, the fertilizers wash away and can pollute streams, ponds, and other bodies of water. It can also leach away from the plant's root zone. It may enter the food chain through the plant and accumulate to harm us.



## Findings

This paper will investigate the concept of agriculture, specifically the area of crops and fertilizers. Farmers' opinions on the effectiveness of inorganic fertilizers in agriculture: the majority of farmers nowadays are adopting inorganic fertilizers, which have a major effect on farmers since they provide nutrients directly to the plants. Although the majority of farmers acknowledged that inorganic fertilizers were beneficial for the soil's quality, contrary to what we have all long assumed, inorganic fertilizers do not deliver nutrients to the soil.

Nonetheless, Kifayatullah K. et al.'s (2020) study says that, accordingly, overuse of inorganic fertilizers has caused soil, air, and water pollution through nutrient leaching, destruction of soil physical characteristics, accumulation of toxic chemicals in water bodies, and so on, as well as severe environmental problems and loss of biodiversity. We now know that the excessive application of nitrogen fertilizers to the soil, which devastates our ecology, is the root cause of these behaviors. Because it takes longer for nutrients from organic matter to reach the plant when employing organic matter as a fertilizer, which results in a slow pace of growth, inorganic fertilizers are considerably more effective than organic fertilizers.

Yet, inorganic substances or synthetic fertilizers can provide the soil and the plant with a quick method for obtaining nutrients. The data was gathered from 50 farmers or respondents, a lot of whom used inorganic fertilizers on their rice fields since they promote the fastest plant growth. Because rice is so essential to Filipinos, utilizing inorganic fertilizers to improve mass production makes the most sense. Farmers sell more of their crops and grow more during this short period. Farmers claim that using inorganic fertilizers improves crop quality and yields, leaving crops with better color and texture. Handling inorganic fertilizers can be difficult; the large number of farmers who took part in the poll were questioned if they were familiar with handling inorganic fertilizers correctly; only a few are knowledgeable and proficient around it, and half are still trying to figure it out.

According to the Department of Agriculture, the average price of fertilizer for 50 kg of urea is between 2,490 PHP and 2,523 PHP. Fertilizers cost 12,000 PHP per hectare for half of the farmers, while the other half did not spend that much. Triple 14, urea, 1620 fertilizer, and 21-00 fertilizer are a few common varieties of fertilizers. All of the farmers in the survey use these types of fertilizers on their crops. As previously stated, plants treated with inorganic particles are more abundant than plants not treated the same way.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

This paper's main goal is to compare inorganic fertilizer to organic fertilizer and understand how it affects farmers. This study came to the following conclusions: When produced in large quantities, inorganic fertilizers are more efficient than organic fertilizers. The study concludes that excessive use of chemical fertilizers can cause soil pollution. Inorganic matter does contribute to crop quality, greater leaf color and texture, and soil quality. Organic fertilizers are much safer to use, but they have a few limitations, including the fact that NPK directly influences plant growth by feeding the plant, some organics can take longer to make the lawn greener, and it frequently takes longer to make your plants thrive. Crops that were treated with inorganic fertilizers came out more flavorful than the organically treated plants.

The farmer's usage of inorganic fertilizers in terms of quantity, kind, and crop yield led to the following conclusions:

The majority of farmers employ urea, triple 14, 1620, and 21-00 fertilizers, which include the essential nutrients for the soil and crops. According to the Department of Agriculture, farmers spent more than 12,000 PHP on inorganic fertilizers, which typically cost between 2,490 PHP and 2,523 PHP. Some farmers still have plenty to learn about the proper handling and use of inorganic fertilizers. Yet excessive fertilizer use, regardless of the type, degrades soil quality and is a major contributor to soil erosion. Without healthy soil, planting can be challenging, and the country's food shortage will only get worse. It is crucial to understand how to use inorganic fertilizers. This essay will serve as a reference for farmers, researchers, and anybody interested in learning more about fertilizers.

### Recommendations

One of the goals of this research is to determine how effective inorganic fertilizers are in agriculture and how farmers can use the long-term effects of these fertilizers on various livestock and crops. The findings of this study suggest that farmers can use inorganic fertilizers like urea, triple 14, 1620, and 21-00 because they are beneficial to their crops, particularly rice fields. The study also suggests that instead of using organic fertilizer, farmers should try combining organic and chemical fertilizers because they are more effective than organic fertilizer alone. Farmers can now have a better idea of what to choose and what to use for their plants by considering the contents and physical properties of a fertilizer, which increases plant growth faster than other fertilizers. During the data collection process, researchers interviewed only 50 people in a Barangay outside the Espian community to learn about their perspectives on the use and effects of inorganic fertilizer on their rice fields. However, the Barangay does not have a large number of farmers. As a result, future researchers should seize the opportunity to survey a broader range of respondents about the use of inorganic fertilizers and investigate the benefits of inorganic fertilizers more thoroughly.

They can also experiment by comparing the effectiveness of organic and inorganic fertilizers on different plants to learn more about the different contents of both fertilizers that promote plant growth and which are more effective for farmers to use. Furthermore, because the researchers of this study concentrated on the effects of inorganic fertilizer on rice field crops, future researchers will have the opportunity to study the effects of inorganic or synthetic fertilizers not only in rice fields but also in different plant varieties and conduct a study on how to eliminate the negative effects of inorganic fertilizers for both agriculture and human health. After that, they can compare their study to ours and assess how the significance of this research contributes to society in terms of the knowledge and techniques that farmers can learn from the study and apply to their respective fields that are essential for agriculture.

### IMPLICATIONS

The implications of this study suggest that the use of inorganic fertilizers in agriculture, particularly for rice cultivation, can lead to significant benefits such as improved growth, quality, and productivity of rice crops. However, it also highlights the trade-off between the advantages and disadvantages of using inorganic fertilizers, as they may be more efficient in providing nutrients but are less safe and natural compared to organic alternatives. Therefore, there is a need for a balanced approach that considers both the productivity gains and the potential environmental and health risks associated with the use of inorganic fertilizers in agricultural practices.

## REFERENCES

- Arif, M., Ilyas, M., Riaz, M., Ali, K., Shah, K., Haq, I. U., & Fahad, S. (2017). Biochar improves phosphorus use efficiency of organic-inorganic fertilizers, maize-wheat productivity and soil quality in a low fertility alkaline soil. *Field Crops Research*, 214, 25-37.
- Aryal, J. P., Sapkota, T. B., Krupnik, T. J., Rahut, D. B., Jat, M. L., & Stirling, C. M. (2021). Factors affecting farmers' use of organic and inorganic fertilizers in South Asia. *Environmental Science and Pollution Research*, 28(37), 51480-51496.
- Baghdadi, A., Halim, R. A., Ghasemzadeh, A., Ramlan, M. F., & Sakimin, S. Z. (2018). Impact of organic and inorganic fertilizers on the yield and quality of silage corn intercropped with soybean. *PeerJ*, 6, e5280.
- Choudhary, M., Meena, V. S., Panday, S. C., Mondal, T., Yadav, R. P., Mishra, P. K., ... & Pattanayak, A. (2021). Long-term effects of organic manure and inorganic fertilization on biological soil quality indicators of soybean-wheat rotation in the Indian mid-Himalaya. *Applied Soil Ecology*, 157, 103754.
- Eze, S., Palmer, S. M., & Chapman, P. J. (2018). Soil organic carbon stock in grasslands: Effects of inorganic fertilizers, liming and grazing in different climate settings. *Journal of environmental management*, 223, 74-84.
- Fang, H., Liu, K., Li, D., Peng, X., Zhang, W., & Zhou, H. (2021). Long-term effects of inorganic fertilizers and organic manures on the structure of a paddy soil. *Soil and Tillage Research*, 213, 105137.
- Gosal, S. K., Gill, G. K., Sharma, S., & Walia, S. S. (2018). Soil nutrient status and yield of rice as affected by long-term integrated use of organic and inorganic fertilizers. *Journal of Plant Nutrition*, 41(4), 539-544.
- Hammad, H. M., Khaliq, A., Abbas, F., Farhad, W., Fahad, S., Aslam, M., ... & Bakhat, H. F. (2020). Comparative effects of organic and inorganic fertilizers on soil organic carbon and wheat productivity under arid region. *Communications in Soil Science and Plant Analysis*, 51(10), 1406-1422.
- Huang, R., McGrath, S. P., Hirsch, P. R., Clark, I. M., Storkey, J., Wu, L., ... & Liang, Y. (2019). Plant-microbe networks in soil are weakened by century-long use of inorganic fertilizers. *Microbial biotechnology*, 12(6), 1464-1475.
- Islam, M. A., Ferdous, G., Akter, A., Hossain, M. M., & Nandwani, D. (2017). Effect of organic, inorganic fertilizers and plant spacing on the growth and yield of cabbage. *Agriculture*, 7(4), 31.
- Islam, M. A., Islam, S., Akter, A., Rahman, M. H., & Nandwani, D. (2017). Effect of organic and inorganic fertilizers on soil properties and the growth, yield and quality of tomato in Mymensingh, Bangladesh. *Agriculture*, 7(3), 18.
- Kakar, K., Xuan, T. D., Noori, Z., Aryan, S., & Gulab, G. (2020). Effects of organic and inorganic fertilizer application on growth, yield, and grain quality of rice. *Agriculture*, 10(11), 544.
- Kashem, M. A., Sarker, A., Hossain, I., & Islam, M. S. (2015). Comparison of the effect of vermicompost and inorganic fertilizers on vegetative growth and fruit production of tomato (*Solanum lycopersicum* L.). *Open Journal of Soil Science*, 5(02), 53.
- Khan, A. A., Bibi, H., Ali, Z., Sharif, M., Shah, S. A., Ibadullah, H., ... & Ali, S. (2017). Effect of compost and inorganic fertilizers on yield and quality of tomato. *Academia Journal of Agricultural Research*, 5(10), 287-293.
- Kilic, N., Burgut, A., Gündesli, M. A., Nogay, G., Ercisli, S., Kafkas, N. E., ... & Szopa, A. (2021). The effect of organic, inorganic fertilizers and their combinations on fruit quality parameters in strawberry. *Horticulturae*, 7(10), 354.
- Liverpool-Tasie, L. S. O., Omonona, B. T., Sanou, A., & Ogunleye, W. O. (2017). Is increasing inorganic fertilizer use for maize production in SSA a profitable proposition? Evidence from Nigeria. *Food policy*, 67, 41-51.
- Mi, W., Sun, Y., Xia, S., Zhao, H., Mi, W., Brookes, P. C., ... & Wu, L. (2018). Effect of inorganic fertilizers with organic amendments on soil chemical properties and rice yield in a low-productivity paddy soil. *Geoderma*, 320, 23-29.
- Moe, K., Mg, K. W., Win, K. K., & Yamakawa, T. (2017). Combined effect of organic manures and inorganic fertilizers on the growth and yield of hybrid rice (Palethwe-1). *American Journal of Plant Sciences*, 8(5), 1022-1042.
- Moe, K., Moh, S. M., Htwe, A. Z., Kajihara, Y., & Yamakawa, T. (2019). Effects of integrated organic and inorganic fertilizers on yield and growth parameters of rice varieties. *Rice Science*, 26(5), 309-318.
- Moriconi, J. I., & Santa-Maria, G. E. (2013). A theoretical framework to study potassium utilization efficiency in response to withdrawal of potassium. *Journal of experimental botany*, 64(14), 4289-4299.
- Mowbot Team (2020, May 12). *Organic Fertilizer Vs. Inorganic | Mowbot*. Mowbot. <https://mowbot.com/blog/organic-fertilizer-vs-inorganic/#:~:text=and%20environmental%20impact-,Organic%20fertilizer%20vs.,slower%2C%20more%20naturally%20and%20healthily>.
- Pan, H., Chen, M., Feng, H., Wei, M., Song, F., Lou, Y., ... & Zhuge, Y. (2020). Organic and inorganic fertilizers respectively drive bacterial and fungal community compositions in a fluvo-aquic soil in northern China. *Soil and Tillage Research*, 198, 104540.
- Qaswar, M., Jing, H., Ahmed, W., Dongchu, L., Shujun, L., Lu, Z., ... & Huimin, Z. (2020). Yield sustainability, soil organic carbon sequestration and nutrients balance under long-term combined application of manure and inorganic fertilizers in acidic paddy soil. *Soil and Tillage Research*, 198, 104569.
- Rahman, K. A., & Zhang, D. (2018). Effects of fertilizer broadcasting on the excessive use of inorganic fertilizers and environmental sustainability. *Sustainability*, 10(3), 759.
- Roba, T. B. (2018). Review on: The effect of mixing organic and inorganic fertilizer on productivity and soil fertility. *Open Access Library Journal*, 5(06), 1.
- Sharma, A., & Chetani, R. (2017). A review on the effect of organic and chemical fertilizers on plants. *Int. J. Res. Appl. Sci. Eng. Technol*, 5, 677-680.
- Syngenta Group (2023). *Challenges for modern agriculture*. Syngenta. <https://www.syngenta.com/en/innovation-agriculture/challenges-modern-agriculture>
- Wu, W., Wu, J., Liu, X., Chen, X., Wu, Y., & Yu, S. (2017). Inorganic phosphorus fertilizer ameliorates maize growth by reducing metal uptake, improving soil enzyme activity and microbial community structure. *Ecotoxicology and Environmental Safety*, 143, 322-329.

### Author(s)' Statements on Ethics and Conflict of Interest

<b>Ethics Statement</b>	The author/s hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. The author/s take full responsibility for the content of the paper in case of dispute.
<b>Originality and Plagiarism Assessment</b>	The manuscript has a similarity assessment of less than 20% in accordance with the publication ethics in terms of originality and plagiarism and the plagiarism policy of the journal.
<b>Statement of Interest</b>	The author/s have no conflict of interest to declare.
<b>Funding</b>	None

**Suggested Citation**

**American  
Psychological  
Association (APA)**

Finez, D. D. E., & Talimbay, J. E. (2023). Advantages and disadvantages of using inorganic fertilizers for agriculture. *International Journal of Transdisciplinary Research and Innovations*, 1(1), 1-7.

**Author Biographies**

**Danlie Dox E. Finez**, Senior High School, High School Department, Espiritu Santo Parochial School of Manila, Inc., Manila, Philippines. Email: danliedoxf@gmail.com

**Jasper E. Talimbay**, Senior High School, High School Department, Espiritu Santo Parochial School of Manila, Inc., Manila, Philippines. Email: talimbayjasper27@gmail.com

Copyright © 2023 by the Author/s  
Danlie Dox E. Finez and Jasper E. Talimbay

*This page is intentionally left blank.*

